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**GRAZING AND CUTTING AS CONSERVATION MANAGEMENT  
TOOLS – THE NEED FOR A CAUTIOUS APPROACH, WITH  
SOME EXAMPLES OF RARE MOTHS WHICH HAVE BEEN  
ADVERSELY AFFECTED**

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THERE ARE NOW numerous books, booklets and papers dealing with grazing for conservation purposes and some now include the preferences of the different species of butterflies. An early one, which is still a good starting point is *The management of chalk grassland for butterflies* (NCC, 1986) which includes a helpful table showing that in general the blues (*Lycaenidae*) prefer shorter swards than the browns (*Satyrinae*). The grassland section in Peter Kirby's habitat management handbook (Kirby, 1992) is still one of the best balanced and most graphic accounts which considers the varied needs of invertebrates as a whole, as does the more complex treatment in *Habitat conservation for insects* edited by Fry & Lonsdale (1991) and *The lowland grassland management handbook* by Crafts & Jefferson (1999). The purpose of this article is not to duplicate the advice in these texts, but to highlight a few recent examples of grazing or mowing issues affecting some of the rarer British moths.

Grazing can be a real problem subject, both on conservation sites and elsewhere. The first aim on conservation sites really should be to identify the vision of what the grazing is to achieve – what should the site look like under satisfactory management? In my view the vision should be based on what is known of the requirements of the priority animals and plants which occupy the site. Where little is known, the aim is usually to maintain consistency with historical management under the assumption that what is there now has persisted under that regime. This assumes that management has indeed been consistent and that we can reproduce it, which is not necessarily the case. Also, in my view, many species have survived on some sites in spite of management, surviving adverse conditions in adjacent habitat which may no longer be present. Sometimes they can do better under management which addresses their needs more directly.

The vision of the site needs to be agreed and defined as specifically as possible at the start so that everyone involved is working to the same end, but it seldom is. Then there are the issues of what livestock to use, what is available, when to put them on, how many and for how long, and where to put them when they have achieved the desired result. The stockman may have additional worries such as water supply and stock safety. The rate of growth of grasses and herbs varies from season to season and depends on rainfall, temperature, and other factors, so grazing by a certain number of animals for a particular time can produce different results in different years, perhaps varying from just a light graze to stripping the ground bare. With so many variables, it is little wonder that every year I receive reports and see examples

of sites disastrously overgrazed, while other sites are overly rank or neglected because suitable grazing cannot be arranged. To further complicate matters, the vision to aim for varies greatly depending on the type of site and the priority species on it. A closely grazed sward may be appropriate for downland where the Large Blue *Maculinea arion*, Adonis Blue *Lysandra bellargus* or Silver-spotted Skipper *Hesperia comma* occur, but it is unlikely to be the best option on most wet meadows, where many Lepidoptera depend on the full growth of herbs and forbs. Even on downland, there are many species which require a longer sward. The colourful, dayflying Six-spot Burnet moth *Zygaena filipendulae* and the Narrow-bordered Five-spot Burnet *Z. trifolii* will be familiar to most readers, but think where you see them most. Usually they are on roadside verges and other marginal land which escapes heavy cutting or grazing. Both spin their cocoons high up on grass stems, which are not present in closely shorn swards. Species are also likely to be associated with taller swards if part of the life cycle depends on the flowers or seedheads of the foodplant, such as the larvae of the Netted Pug *Eupithecia venosata* and the Tawny Shears *Hadena perplexa*, both of which feed on the ripening seeds of Bladder Campion *Silene vulgaris*. The Marbled White *Melanargia galathea* is widely known to favour longer swards, so if the wonderful sight of large numbers of these butterflies is an important one on a site, the last thing you would wish to do would be to graze it flat.

### **Black-veined Moth *Siona lineata* (Scop.)**

The use of appropriate grazing at one of the four surviving sites for this endangered and protected moth, in Kent, has enabled the English Nature Species Recovery Programme to build up numbers of adults to the point where they have dispersed and colonised at least one and possibly two additional sites. First, the ecology of the moth was studied, then the vision of the ideal site was formulated, then the skill of land managers was used to achieve it, and the increase in numbers followed. The summary specification was to provide the moth with a sward of Tor-grass *Brachypodium pinnatum* 10-25 cm in height when measured in June (see *Butterfly Conservation News* 50: 51-53 for method), with Marjoram *Origanum vulgare*, the major larval foodplant, present in every other pace when walking through the sward. This has been achieved by careful winter-grazing by cattle. Having sheep on in March or April proved disastrous in that they ate most of the fresh spring growth of Marjoram that the overwintered larvae needed to complete their growth. Incidentally, the larva spins its vertical cocoon in grass tussocks from the previous year and the adult moth lays its eggs on grass-blades, so a short sward of Marjoram without grass is no use.

There have been other grazing disasters in this Recovery Project. A potential establishment site was grossly overgrazed when the BSE crisis meant that the cattle could not be sold as planned and were left on site for too long. Three years later and the site has only partly recovered. The rare Straw



Belle moth *Aspitates gilvaria* occurs on this site and only survived by occupying the longer swards surviving around the lip of an adjacent quarry. Overgrazing by sheep and cattle on part of one of the sites occupied by the Black-veined moth has reduced the population density of this species to a fraction of that on an adjacent part of the site from which the livestock have been largely excluded. Furthermore, such overgrazing, possibly accompanied by past use of fire to burn off excess grass, has been implicated in the loss of Adders *Vipera berus* Forester Moths *Adscita statices* and the Duke of Burgundy butterfly *Hamearis lucina* from this site, and all the losses have occurred since it became a nature reserve!

At one of the other sites it has been found that the rate of change in the sward is so slow that grazing is needed only infrequently, due to thin soils. Grazing or cutting the sward has not been necessary for several years and grazing has been avoided because of the risks of it going wrong. The population density of Black-veined moths on this site is still the highest of all known sites and the Duke of Burgundy *Hamearis lucina* is also doing well under this regime. Another site has been subdivided and only one part is grazed in any year, again to avoid a catastrophe affecting the whole site, which still retains a population of Adders. At the same time, other former sites for the Black-veined moth have been completely lost to encroachment by scrub through lack of grazing or any other form of management.

It should be noted that by creating a small-scale mosaic of different sward lengths on part of one site, it has been possible to support the Black-veined moth with its long-sward requirements alongside the Adonis Blue, which is presumably breeding in the gaps between the tussocks. This has much greater potential for invertebrates than a sward grazed uniformly short all over. Cattle are better than sheep in achieving such mosaics because of the way they feed by pulling holes in the sward rather than nibbling it.

### **Silky Wave *Idaea dilutaria* (Hb.)**

The Silky Wave is known from only three sites in Britain. One of these, on the Great Orme in North Wales, is so overgrazed by sheep in some years that the moth is confined to the few places where Common Rock-rose *Helianthemum nummularium* can still thrive and flower, the small hollows where the soil is probably a bit deeper and growth faster, and where the sward is protected to some extent by growing amongst low scrub.

### **More problems of overgrazing in uplands and lowlands**

Overgrazing by sheep is a large-scale problem in many upland areas, affecting the habitat of many moths. In extreme cases it can turn heather-dominated moorland to rough grassland, leaving a long list of moorland species homeless. Domestic stock and deer have devastated the ground-flora and under-storey of some upland woods and lowland areas including the New Forest, with potentially large but generally unmeasured effects on the moth

fauna. David Green's recent study of the fauna and moth records from the New Forest (Green, 2000), demonstrates that a disproportionate number of the declines and losses of Lepidoptera from the New Forest have occurred amongst those species dependent on larval foodplants which are part of the ground cover, compared to species dependent on the tree canopy and other places out of reach of grazing and browsing animals (Green, 2000).

### **The New Forest Burnet moth *Zygaena viciae argyllensis* Tremewan**

Overgrazing nearly wiped out the last remaining British colony of the New Forest Burnet moth in the late 1980s. The colony is on a remote grassy slope in western Argyll where the larvae feed on legumes (eg., *Lathyrus* and *Lotus* spp.). The moth only survived because there were some rocky ledges inaccessible to sheep. Since 1990, the area has been fenced to exclude sheep. As a result the moth has re-colonised the longer, herb-rich sward which is now growing again on the main slope and its population has increased substantially.

### **Some other case histories of nationally scarce moths**

A number of other nationally scarce or local moths associated with legumes are threatened by overgrazing. The Belted Beauty *Lycia zonaria* is suffering on its few mainland sites in western Scotland and on some of the offshore islands where the caterpillars feed on Bird's-foot Trefoil *Lotus corniculatus*. Lepidopterists have returned to sites where the larvae used to be abundant, only to find them grazed flat, with no trace of larvae. The Scarce Forester *Adscita globulariae* was nearly wiped out at its single colony in Kent in 1994/95 by overgrazing arranged by a conservation agency within a couple of years of the rediscovery of the moth there. The larva feeds on the foliage of Common Knapweed or Hardhead *Centaurea nigra* and Greater Knapweed *C. scabiosa* and overwintering larvae probably also benefit from the presence of a layer of plant litter for winter shelter. Less intensive grazing of this site has since been agreed. The Forester moth *A. statices* used to be called the Common Forester until it became so localised that this was a nonsense. It has suffered greatly as permanent pasture has been ploughed up or reseeded for other agricultural uses. It also likes a well-developed sward. It was wiped out at Wye Downs National Nature Reserve in Kent by overgrazing when the site became a nature reserve and in Kent is now only known from a single site which is infrequently cut and where herbs are allowed to flower and set seed. Both the sites where the Essex Emerald moth *Thetidia smaragdaria* was last seen in the wild have been so over-managed in the last couple of years, in one case by sheep-grazing and in the other by mowing, that the larval foodplant (Sea Wormwood *Artemisia maritima*) has been completely wiped out. It is very likely that colonies of this moth were lost this way in the past.

So grazing really is a double-edged sword, it can easily be overdone and be very damaging. The biggest problem is that if grazing makes a site unsuitable

for a species, even for just a year or two, it is unlikely to find its way back because sites have become isolated islands separated by a hostile environment. As a conservation tool grazing is best used only when needed, cautiously and in an informed way, with careful monitoring of the results. The lightest possible stocking levels are best, this giving more leeway in general and in case the stock remain on site for longer than intended. If in doubt, graze only part of the site at any one time.

### **Herbaceous plants in the sward**

Apart from keeping a watch on the length of the sward, the frequency and size of the herbaceous plants in the sward is very important. Often sheep will selectively graze out some herbs so that they are very small and scarce even when the grass sward still looks substantial. Conversely, if grass growth and the build-up of grass litter are not checked at all, the growth of herbs may be swamped or suppressed. Many moths need specific herbs to be present as larval foodplants, and a wide variety of flowering herbs extends the amount and time of availability of nectar for adult moths. Like many other insects of grasslands, the species of moths which live there often visit the flowers of woody plants in adjacent hedgerows or the edges of woods for nectar also.

### **Measurements for monitoring sward characteristics**

Because of the influence of sward height and the frequency of particular herbs, it is important to have simple and quick means of measuring and defining them. The Boorman drop-disc method is very effective for measuring sward height and was described in *Butterfly Conservation News* **50**: 51-53. I measure the frequency and distribution of particular herbs by counting the number of paces in which the plant is seen in a 50 or 100 pace transect line through the sward. By recording the number of each pace as I walk the transect, I also obtain an indication of whether the plant is distributed evenly throughout the sample or clumped, say just in the early paces or the last ones, with big gaps in between. Thus the management prescription for the Black-veined moth is to achieve a sward in the range of 10-25cm in height, as measured by the drop-disc method, with a frequency of Marjoram of 50%, preferably at least one plant in every other pace. The larva has been recorded feeding on other plants besides Marjoram but Marjoram is just about the only foodplant at one of its sites and is a good indicator of an appropriate sward at the other three. When Marjoram is frequent other suitable herbs usually are too.

### **Mosaic habitats**

Although different species of moths and butterflies may vary in sward preferences, it is possible for them to coexist in the same area by managing not for a uniform sward (uniformity is always a bad idea when the aim is to



conserve diversity) but for a small-scale mosaic of different sward heights, from bare ground to tussocks side by side. In fact, some Lepidoptera, and many other invertebrates, use several components of the mosaic. The caterpillar of the Black-veined moth roosts on dead grass stems from the previous year and spins its cocoon among the blades of the current year, on which the eggs are also laid, but likes to feed on the Marjoram in the holes in the sward, without letting go of the grass stems with its hind end, so it really does need a close juxtaposition. Many other moth species have larvae which bask in the short patches but over-winter in the cover provided by litter or grass tussocks.

### **The need for annual grazing or mowing**

There is no question that without some form of grazing, hay-cutting or mowing, grassland sites can become too rank, or overgrown with scrub. However, the speed with which the habitat changes is seldom such that grazing or cutting is needed on an annual basis over the whole site. Again, dividing up a site into two or more compartments can be a help, allowing the grazier an annual visit, but not to the same bit of ground every year.

### **Gradual versus episodic change**

A feature of low intensity grazing is that the rate of removal of vegetation may simply keep up with plant growth, resulting in no sudden or dramatic change, unlike cutting or mowing an area. Moth catches in light-traps and butterfly counts by day typically crash after an area is cut. I doubt that this is because large numbers are killed during the cutting and I presume that the adults simply move away because the cut area no longer suits them, at least in the short-term. The survival of such species on site depends on the eggs already laid before the cut, and/or the opportunities to recolonise from elsewhere as the site recovers.

### **Conservation management now a major factor to watch**

As a greater proportion of the surviving sites for rare species become SSSIs and nature reserves, through designation or the loss of the unprotected ones, so management in the name of conservation is becoming the major cause of change, and sometimes damage, to these species.

As a striking example of what still happens, in 1997 there was a spectacular instance of a rare moth being adversely affected by ill-planned cutting, at Askham Bog nature reserve, Yorkshire, which is well-known amongst lepidopterists for an isolated colony of the Marsh Carpet *Perizoma sagittata*. An experienced lepidopterist visited the site en route to a holiday in Scotland and was delighted to see and photograph a good number of larvae feeding on the flower-heads of Yellow Meadow-rue *Thalictrum flavum*, the sole foodplant, and he left the larvae to continue development. He revisited the site on his return journey, only to find that the plants had all been cut down. It is

not known whether any of the larvae were able to survive and pupate, where-as if the cutting had taken place a couple of weeks later, after pupation on the ground, the moths would be able to emerge next year and exploit the new growth from the perennial rootstocks. Moth larvae will always be lost during any cutting operation and, in the case of widespread species, the population as a whole will survive in the surrounding area and recolonise if necessary. But small and localised colonies of nationally scarce invertebrates merit special consideration, especially on sites where nature conservation is the primary aim.

The only reliable way to avoid such blunders is to make sure land managers know what key species are on the site, where they occur and when are they least vulnerable to management and to ensure that the whole population is never effected simultaneously by one management operation. This way even if the operation is a disaster, only a proportion of the population will be affected. It still surprises me how seldom such knowledge is available, even on sites which have been nature reserves for years. Perhaps the most usual situation is that there is a file consisting of a handful of casual observations from occasional visitors. Even when surveys are undertaken, there is often not the time to make them anywhere near comprehensive for moths because this would require at least monthly visits throughout most of the year.

Where detailed lists or records exist, this is no guarantee that harmful management will not take place, even on nature reserves and other sites where nature conservation is a major objective. Commonly the species lists have not been translated into adequate guidance for the land manager or his tractor driver or other employees. Furthermore, communications may break down or be forgotten as time goes by and as the personnel change, unless reminders are issued.

### **The booby prize for poor communication in large organisations**

You may have supplied everyone with detailed information about the most endangered species on the site, you may have a joint project underway with the agency which manages the site, and you may have experiments in progress to investigate the effects of different types of management, but that is no guarantee that things will go smoothly, as was proved to me (not for the first time) in 1999. All this was in place with the Environment Agency concerning a colony of Fisher's Estuarine moth *Gortyna borelii* in Essex. On the day that I arrived to meet the local representative of English Nature, who was monitoring the management experiments, we discovered an Environment Agency digger in the act of dredging a dyke and dumping the spoil onto the experimental site while the adult moths were attempting to emerge from their pupae!

### **Some ways in which members of moth groups, branches of Butterfly Conservation and other lepidopterists can help in damage limitation**

Let your county moth recorder or branch moth officer know of anything that you see regarding apparently unsuitable habitat management. It may be that

the lepidopteran interest has been considered but that there are other higher priorities, but it is just as likely that the needs of particular moths have not been considered. The county moth recorder is likely to have contact with or know of the relevant local conservation agencies who can advise on and follow up management issues, sometimes resulting in a more favourable outcome.

Find out and get to know the land-owners and managers of sites you visit regularly and keep them informed of the moths you see and what is known of their habitat requirements. The computer database package RECORDER has pre-written paragraphs on the status, habitat and foodplants of each moth species which can be used to automatically annotate any lists of species which you make. This is the simplest way of identifying the species of highest priority on the site and giving an indication of what the most important features of the site are likely to be. More detailed accounts have been published for the UK Biodiversity Action Plan species. If you are concerned about any Nationally Scarce or Red Data Book moth species you can also contact the Moth Officers at Butterfly Conservation, Manor Yard, East Lulworth, Wareham, Dorset, BH20 5QP. E-mail [dgreen@butterfly-conservation.org](mailto:dgreen@butterfly-conservation.org)).

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### Orange-tip *Anthocharis cardamines* (L.) (Lep.: Pieridae) recorded from *Brassica rapa*

Several caterpillars of the Orange-tip butterfly *Anthocharis cardamines* were found feeding on the developing siliquae of *Brassica rapa* on 5 June 2001. The determination was confirmed by Dave Goulson, University of Southampton. The site was at a canal boat moorings by the Kennett and Avon Canal near Claverton, Bath (O.S.grid reference ST 787633). Normally, this species is oligophagous with the preferred host plants being lady's smock *Cardamine pratensis*, garlic mustard *Alliaria petiolata* and charlock *Sinapis arvensis*; *C. pratensis* and *A. petiolata* are by far the most preferred food plant (Dempster,